

REMARKS

INTRODUCTION:

Claims 1-20 were pending; however, claims 1, 4-6, 8, 9, 12, 15, 16, 19 and 20 were withdrawn from consideration. Applicants reserve the right to further prosecute without prejudice all non-elected inventions/species and related claims.

Claims 2, 3, 7, 10, 11, 13, 14, 17 and 18 were rejected.

Claims 2, 7 and 11 were rejected under 35 U.S.C. §102(b) as being anticipated by Takagi (Japanese Patent Publication 10-302997).

Claims 3, 13, 14, and 18 were rejected under 35 U.S.C. §103(a) as being unpatentable over Takagi (Japanese Patent Publication 10-302997) in view of Tepman et al. (USPN 5,879,575) and Okumura et al. (USPN 5,888,413).

Claims 10 and 17 were rejected under 35 U.S.C. §103(a) as being unpatentable over Takagi (Japanese Patent Publication 10-302997) in view of Tepman et al. (USPN 5,879,575) as applied to claims 2, 3, 7, 11 and 8 and further in view of Okumura et al. (USPN 5,888,413).

It is respectfully submitted that no cited reference teaches or suggests a coil antenna having a portion that produces a relatively large capacitive coupling with a reaction tube. Thus, these rejections are respectfully traversed and reconsideration is requested.

In accordance with the foregoing, claims 2, 3, 7, 10, 11, 13, 17 and 18 have been amended, and new claims 21-23 have been added.

No new matter is being presented, and approval and entry of the foregoing amendments and new claims are respectfully requested.

Therefore, claims 2, 3, 7, 10, 11, 13, 14, 17, 18 and 21-23 are now pending and under consideration. Reconsideration is requested.

REJECTION UNDER 35 U.S.C. §102:

In the Office Action at pages 2-3, the Examiner rejected claims 2, 7 and 11 under 35 U.S.C. §102(b) as being anticipated by Takagi (Japanese Patent Publication 10-302997), hereinafter referred to as Takagi). This rejection is respectfully traversed and reconsideration is requested.

Claims 2, 3, 7, 10, 11, 13, 17 and 18 have been amended to recite the invention more clearly. Also, new claims 21-23 have been added.

It is respectfully submitted that, in order for a prior art reference to anticipate a claimed invention, said prior art reference must show each and every element of the claimed invention as arranged in the claim. Connell v. Sears, Roebuck & Co., 722 F2d 1542, 220 USPQ 193, 198 (Fed. Cir. 1983).

Also, the court has held (Verve, LLC. V Crane Cams, Inc., Crower Cams & Equipment Company, Inc. Trend Products, Inc., and Competition Cams, Inc., CAFC, Nov. 14, 2002):

"Invalidity based on 'anticipation' requires that the invention is not in fact new. See, e.g., Hoover Group, Inc. v. Custom Metalcraft, Inc., 66 F.3d 299, 302, 36 USPQ2d 1101, 1103 (Fed. Cir. 1995) ("lack of novelty (most often called 'anticipation') requires that the same invention, including each element and limitation of the claims, was known or used by others before it was invented by the patentee"). A single reference must describe the claimed invention with sufficient precision and detail to establish that the subject matter existed in the prior art See e.g., In re Spada, 911 F.2d 705, 708, 15 USPQ2d 1655, 1657 (Fed. Cir. 1990) ("The reference must describe the applicant's claimed invention sufficiently to have placed a person of ordinary skill in the field of the invention in possession of it.").

Applicants respectfully point out that the Takagi reference discloses a plasma processing apparatus having a first antenna 18 for inductive coupling plasma processing and a second antenna 19 for capacitive coupling cleaning. As is shown in the Representative Drawing (Drawing 1), the first antenna 18 is arranged to face a power introducing window 12 of a reaction tube 11 in a relatively small area. The second antenna 19 is vertically moved by a cylinder 20 (see Drawing 5). When plasma processing, the second antenna 19 is located above the reaction tube 11 (see Drawings 1, 5). When cleaning the reaction tube 11 (see Drawing 6), the second antenna 19 may produce a relatively large capacitive coupling with the reaction tube.

The second antenna 19 is not a portion of the first antenna 18 (see Drawing 1). Although the second antenna 19 may produce a relatively large capacitive coupling with the reaction tube, the second antenna 19 is not a portion of the first antenna 18. Therefore, the Takagi reference does not disclose an antenna having a portion that produces a relatively large capacitive coupling with a reaction tube, as is taught by the present claimed invention (see independent claims 2, 11, 13, and 23).

In addition, the coil antenna of the present claimed invention is moved relative to the reaction tube when plasma processing takes place. This prevents the etching products from attaching to the inner wall of the reaction tube when plasma processing, thereby extending the interval at which the reaction tube should be cleaned. In contrast, the first antenna 18 of Takagi processes with a small antenna area fixed to the circumference of the power introduction aperture and the second antenna 19 of Takagi is located above the reaction tube 11 and is not moved when plasma processing takes place. The second antenna of Takagi "is separated from the power-introducing window when processing, then approaches the power-introducing window when cleaning." (see Abstract) Since the etching products will adhere to the inner wall of the reaction tube 11 during plasma processing, the cleaning operation interval of Takagi will be longer than the cleaning interval of the present claimed invention.

Hence, since Takagi fails to teach or suggest an antenna having a portion that produces a relatively large capacitive coupling with a reaction tube, as is taught by the present claimed invention and fails to teach or suggest the same invention, i.e., the claimed invention, including each element and limitation of the claims, it is respectfully submitted that claims 2, 3, 7, 10, 11, 13, 14, 17, 18 and 21-23 are not anticipated by Takagi (Japanese Patent Publication 10-302997).

REJECTION UNDER 35 U.S.C. §103:

In the Office Action at pages 3-4, the Examiner rejected claims 3, 13, 14, and 18 under 35 U.S.C. §103(a) as being unpatentable over Takagi (Japanese Patent Publication 10-302997) in view of Tepman et al. (USPN 5,879,575) and Okumura et al. (USPN 5,888,413). In addition, the Examiner rejected claims 10 and 17 under 35 U.S.C. §103(a) as being unpatentable over Takagi (Japanese Patent Publication 10-302997) in view of Tepman et al. (USPN 5,879,575) as applied to claims 2, 3, 7, 11 and 8 and further in view of Okumura et al. (USPN 5,888,413). The rejections are respectfully traversed and reconsideration is requested.

Takagi is described above. The Tepman reference shows a plasma processing apparatus having an RF coil 150 and a coil support 270 for supporting the RF coil in FIGs. 5 and 6. However, the coil support 270 is not a portion of the RF coil 150 and does not connect a first winding and a second winding in series, as is taught by the present claimed invention. Thus, the Tepman reference does not show a coil antenna having an intermediate segment which connects a first winding and a second winding in series.

The Okumura reference discloses a planar spiral spiral coil 1 provided on the upper surface of a reaction vessel 5. The planar coil 1 is rotated so that a uniform thickness film is formed on a substrate 8. However, the planar coil 1 is not located around the reaction vessel 5, as is taught by the present claimed invention. If the planar coil 1 is rotated around the reaction vessel 5, a film having a uniform thickness will not be formed on the substrate 8. Hence, Okumura does not teach or suggest the present claimed invention.

It is also respectfully submitted that there is no teaching or suggestion to combine Takagi and Tepman and Okumura et al. The courts have held that the Examiner may not suggest modifying references using the present invention as a template absent a suggestion of the desirability of the modification in the prior art. In re Fitch, 23 U.S.P.Q.2d 1780, Fed Cir. 1992. Something in the prior art as a whole must suggest the desirability, and thus, the obviousness, of making the combination. Alco Standard Corp. v. Tennessee Valley Authority, 808 F. 2d 1490, 1 U.S.P.Q. 2d 1337 (Fed. Cir. 1986). When a rejection depends on a combination of prior art references, there must be some teaching, suggestion or motivation to combine the references. In re Geiger, 815 F.2d 686, 688 2 U.S.P.Q.2d 1276, 1278 (Fed. Cir. 1987).

Claims 10 and 17 are dependent claims. Dependent claims depend from the above-discussed independent claims and are patentable over the prior art for at least the reasons discussed above.

Thus, since there is no teaching or suggestion of certain inventive features and no teaching or suggestion of combining Takagi and Tepman et al. or combining Takagi, Tepman et al. and Okumura et al., it is respectfully submitted that claims 2, 3, 7, 10, 11, 13, 14, 17, 18 and 21-23 are patentable over Takagi and Tepman et al. and are patentable over Takagi, Tepman et al. and Okumura et al..

ATTACHMENT

Attached hereto is a "Version With Markings to Show Changes Made," comprising a marked-up version of changes made to the Claims by the current amendment.

CONCLUSION:

In accordance with the foregoing, it is respectfully submitted that all outstanding objections and rejections have been overcome and/or rendered moot. And further, it is respectfully submitted that all pending claims patentably distinguish over the prior art. Thus, there being no further outstanding objections or rejections, the application is submitted as being in condition for allowance which action is earnestly solicited.

If the Examiner has any remaining issues to be addressed, it is believed that prosecution can be expedited by the Examiner contacting the undersigned attorney for a telephone interview to discuss resolution of such issues.

If there are any additional fees associated with the filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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VERSION WITH MARKING TO SHOW CHANGES MADE**IN THE CLAIMS**

Please **AMEND** claims 2, 3, 7, 10, 11, 13, 17 and 18, as follows. The remaining claim (14) is reprinted, as a convenience to the Examiner, as it presently stands before the U.S. Patent and Trademark Office. Please **ADD** new claims 21-23.

2. (ONCE AMENDED) A plasma etching apparatus comprising:

a reaction tube made of a dielectric material in the form of a cylinder;

a high frequency coil antenna located around the reaction tube for generating a plasma inside the reaction tube, the high frequency coil antenna having a portion that produces a relatively large capacitive coupling with the reaction tube[;]a power supply terminal connected to a plasma source high frequency power supply[;]and a ground terminal connected to a ground; and

a drive mechanism for moving at least one of the high frequency coil antenna and the reaction tube relative to the other when performing plasma etching.

3. (ONCE AMENDED) The plasma etching apparatus according to claim 2, wherein the high frequency coil antenna includes a plurality of [windings] winding portions and a sloped segment for connecting the plurality of [windings] winding portions to one another in series.

7. (ONCE AMENDED) The plasma etching apparatus according to claim 2, wherein [a part of the high frequency antenna] the portion that produces a relatively large capacitive coupling with the reaction tube is located closer to the reaction tube than the remaining portion of the high frequency coil antenna.

10. (ONCE AMENDED) The plasma etching apparatus according to claim 2, further comprising a controller connected to the drive mechanism for controlling a relative moving speed between the high frequency coil antenna and the reaction tube.

11. (ONCE AMENDED) A plasma processing apparatus comprising:

a processing chamber for performing predetermined process on a workpiece;

a reaction tube connected to the processing chamber, the reaction tube being made of a dielectric material in the form of a cylinder;

a high frequency coil antenna located around the reaction tube for generating a plasma inside the reaction tube, the high frequency antenna having a portion that produces a relatively large capacitive coupling with the reaction tube[;], a power supply terminal connected to a plasma source high frequency power supply[;], and a ground terminal connected to a ground; and

a drive mechanism for moving at least one of the high frequency coil antenna and the reaction tube relative to the other when performing the process on the workpiece.

13. (ONCE AMENDED) A plasma etching apparatus comprising:

an etching chamber for accommodating a workpiece;

a reaction tube connected to the etching chamber, the reaction tube being made of a dielectric material in the form of a cylinder;

a coil antenna surrounding an outer wall of the reaction tube, the coil antenna including a first winding, a second winding, and an intermediate segment connecting the first winding to the second winding;

a plasma generating power supply for supplying high frequency power to the coil antenna; and

a drive mechanism for moving at least one of the coil antenna and the reaction tube relative to the other when performing plasma etching on the workpiece, wherein the intermediate segment is located closer to an outer peripheral surface of the reaction tube than the first winding and the second winding.

14. (UNAMENDED) The plasma etching apparatus according to claim 13, wherein the intermediate segment is inclined with respect to the first winding and the second winding.

17. (ONCE AMENDED) The plasma etching apparatus according to claim 13, further comprising a controller connected to the drive mechanism for controlling a relative moving speed between the [high frequency] coil antenna and the reaction tube.

18. (ONCE AMENDED) The plasma etching apparatus according to claim 13,

wherein the drive mechanism rotates the [high frequency] coil antenna around the reaction tube.

21. (NEW) The plasma etching apparatus according to claim 3, wherein the sloped segment is wound around approximately one fourth of a circumference of a peripheral surface of the reaction tube.

22. (NEW) The plasma etching apparatus according to claim 21, wherein each winding is wound around approximately three-fourths of the circumference of the peripheral surface of the reaction tube.

23. (NEW) A plasma etching apparatus comprising:
a reaction tube made of a dielectric material in a form of a cylinder; and
a high frequency coil antenna, located around the reaction tube, to generate a plasma inside the reaction tube, the high frequency coil antenna having a portion that produces a relatively large capacitive coupling with the reaction tube, a power supply terminal connected to a plasma source high frequency power supply, and a ground terminal connected to a ground.